

20 Cents

THE FORESTER

Vol. VII

MARCH, 1901

No. 3

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THE PLATFORM OF THE FORESTER

In order that the good will of its readers may become as effective as possible in aiding to solve our present forest problems, the FORESTER indicates five directions in which an effective advance is chiefly needed.

1. The forest work of the United States Government which is now being carried on by the Department of Agriculture, the General Land Office, and the Geological Survey conjointly, should be completely and formally unified. The division of authority between the three offices involves great waste, and consolidation is directly and emphatically pointed to by the present voluntary co-operation between them.

2. A system of forest management under the administration of trained foresters should be introduced into the national and state forest reserves and parks.

3. Laws for the protection of the forests against fire and trespass should be adapted to the needs of each region and supported by the provisions and appropriations necessary for their rigorous enforcement.

4. Taxation of forest lands should be regulated so that it will encourage not forest destruction but conservative forest management.

5. The attention of owners of woodlands should be directed to forestry and to the possibilities of applying better methods of forest management.

Persons asking themselves how they can best serve the cause of forestry will here find lines of work suggested, along which every effort will tell. No opportunity for doing good along these lines should be neglected.

J. A. ALLEN,
Editor.

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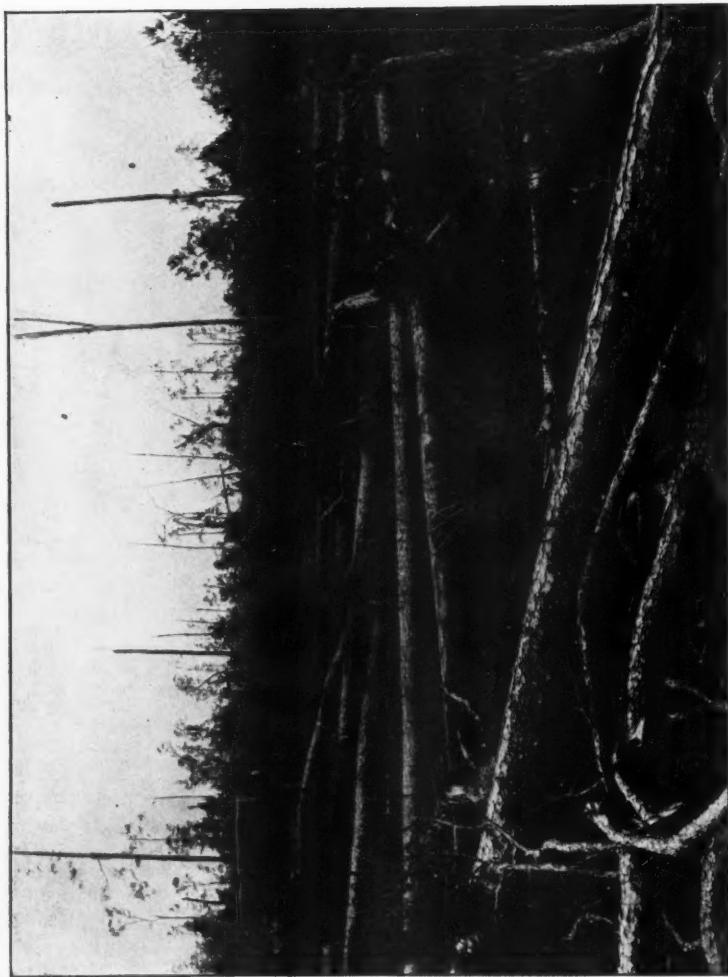
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A LOW SANDY RIDGE OF ALMOST PURE LOBLOLLY PINE TEN MILES NORTHWEST OF NEW CANEY, MONTGOMERY COUNTY, TEXAS. ON MANY SUCH TRACTS THE PINE WAS ENTIRELY DESTROYED BY THE GALVESTON STORM.

THE FORESTER.

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DESTRUCTION OF TIMBER BY THE GALVESTON STORM.

BY WILLIAM L. BRAY.

University of Texas.

SINCE the Galveston storm of September 8th of last year, attention has been so generally directed to the destruction wrought at Galveston and the immediate coast country, that the damage to forests within the storm's area seems not to have excited comment outside of the circle of lumbermen and private owners who sustained the loss of timber.

The forest area which sustained the heaviest damage is comprised in a belt extending from the Trinity River to the western limits of the East Texas Pine lands (about seventy miles), and from the border line of forest land and coast prairie more or less thirty miles northward. This would constitute an area of 2,000 square miles lying in Montgomery and Liberty Counties and a part of Harris and Waller, with possibly also the southern part of San Jacinto County. The fury of the storm was greater west of this area, but as there is no Pine farther west and as only the river bottoms are heavily timbered, the destruction of timber there would be of secondary importance.

The great forest area of the Atlantic Coast Plain reaches its southwestern limit in the region damaged by the storm, and although this is on the confines of a forest land, the timber growth is not only very heavy, but large and valuable as well. It is the region of Loblolly Pine and hard wood forests which lies to the south and west of the fine body of Longleaf Pine of

western Louisiana and eastern Texas. The area covered by this forest type is a low, almost level plain lying just to the interior of the flat coast prairies. The streamways have cut but little below the general level and much of the country is quite undrained, being covered with water except during dry periods. Beside these swamp flats or glades and the streamway bottom land, the low sandy knolls or ridges are a characteristic feature. Each of these features supports its characteristic timber growth. That of the bottom land along the streams is a very dense forest of large growth in which species of Oak predominate—or at least are the dominant valuable tree—and in which a considerable percentage of Loblolly Pine may occur. One lumber concern reports having cut as high as 4,000 feet each of White Oak (*Quercus Michauxii*) and Loblolly (*Pinus taeda*) per acre in the San Jacinto bottoms. The sandy ridges or knolls have chiefly a heavy growth of Loblolly Pine which not unfrequently becomes pure Pine forest yielding upward of 10,000 feet (board measure) to the acre. The swampy land has very little Pine and White Oak, but a tangled growth of Gums, Water Oak, undergrowth and climbing vines. These stretches are chiefly significant because of the difficulties they offer to logging operations.

Lumbering operations have been conducted on parts of this body of timber for

many years, as a consequence of which the large timber has been removed from a very considerable portion, but many thousands of acres of the finest Loblolly and Oak were standing at the time of the storm, and the whole area was thickly timbered, for the cut-over land is being renewed by a luxuriant growth either of Loblolly Pine wholly, or of the former mixture of pine and hard woods.

best timber over the entire area, does not express the storm's action adequately, for not all parts of the area were affected alike. Upon thousands of acres the destruction amounted to practically one hundred per cent. of the merchantable timber, which in some cases, notably of pure pine forest, meant almost every tree. (Fig. 1.) The area of greatest damage seems to extend from the Peach Creek fork of the San Ja-



FIELD OF PURE LOBLOLLY PINE TWO MILES SOUTHWEST OF NEW CANEY, MONTGOMERY CO, TEXAS, TIMBER ALL LARGE AND OF FINE QUALITY. TOTALLY DESTROYED BY THE GALVESTON STORM.

Stated in brief, the effect of the storm was to prostrate at least fifty per cent. of all merchantable pine and oak, and to beat and whip the whole forest into a ragged, tangled wilderness through which immediately after the storm it was impossible to proceed except on foot, and even after five months only a few main roads are barely passable.

The estimate of fifty per cent. of the

cinto River east of New Caney, westward through Montgomery County south of the Santa Fe Railway (Conroes Branch). The writer personally inspected several tracts of uncut timber in this region upon which splendid timber of Loblolly Pine that would cut 10,000 feet to the acre was entirely destroyed. (Fig. 1 and Frontispiece.) It was reported that practically all of the heavy oak timber along the fork of

the San Jacinto east and northeast of New Caney was destroyed. In a walk of several miles nearer that village than the tracts of heaviest oak timber, it appeared to the writer that every large specimen of White Oak (*Quercus Michauxii* and *alba* (?)), of Pin Oak (*Q. pogodaefolia*), and most of the Loblolly had been felled by the storm so that one could readily believe that the thicker oak timber was a

probably total. This same company suffered great loss in its Pine lands, but some of this lying adjacent to a tramway will be saved. (Fig. 4.) A firm at Dayton in Liberty County writes: "About one-half of all valuable oak and pine timber in this section was blown down by the Galveston storm."

Although there was a tremendous whipping and breaking of branches, the storm



LOG TRAM THROUGH STORM DAMAGED AREA TEN MILES NORTHWEST OF NEW CANEY, TEXAS. MOST OF THE FALLEN TIMBER HERE WILL BE SAVED. SHOWS TATTERED CONDITION OF FOREST, AND AN AREA OF TOTAL DESTRUCTION IN MID GROUND.

total wreck. One lumber company estimates a loss of seventy per cent. of the timber on one of its tracts of 13,000 acres in Montgomery County. An individual owner of some 3,000 acres at New Caney, probably one-half of which had been logged, estimates his loss upon the remainder at \$5,000. Another lumber company reports the loss of oak timber on a league of land northeast of New Caney as

rarely broke the tree trunks—it simply uprooted them. This was the more easily done because the soil, normally not tenacious, had been rendered very soft by the excessive rains of the preceding nine months. So the destruction of pine on the loose sandy soil, and of the oak and pine on the soft alluvial bottom land was so much easier and completer.

The fury of the storm after passing in-

land was expended westward of this area. Probably no part of the vortex of the hurricane crossed this timber belt, as the center lay between Galveston and the mouth of the Brazos River. The destructive wind blew from north of east and excepting in a few tangles, the trees fell to the southwest.

As to the future, it is estimated that not over ten per cent. of the blown down timber will be saved. Of course on those tracts accessible to mills or trams much or nearly all will soon be worked up into lumber. But the rest will be exposed a year or two to be attacked first by insects and then by fire. Thus, thousands of acres will be denuded and ready to begin anew the long process of reforestation. That it will be reforested cannot be doubted for it is an area in which tree growth exhibits tremendous energy in occupying the soil. Even now on the recent clearings, dense thickets of Loblolly or thousands of young oaks abound.

This is not the first time a hurricane has wrought damage upon this timber area. The storm of September, 1875, was similarly destructive. There is to this day a strip, more or less, 20 miles wide extending 100 miles north and south through Montgomery, San Jacinto and Polk Counties, called, "the hurricane" upon which the timber was almost completely destroyed in the hurricane of 1875. Subsequently it was cleared off by fire and is at present in the early stages of reforestation to oak and pine.

The position of this forest area so near the border of the treeless arid regions of the Southwest gives it special significance and value. One must regret that it should be the object of the fury of Gulf hurricanes. But there is a lesson for us in the tenacity with which the region maintains its forest identity. We ought to cooperate with nature in keeping a constantly productive forest on such lands.

COLORADO FOREST FIRES IN NINETEEN HUNDRED.

By HENRY MICHELSEN.

Vice-President of the Colorado Forestry Association.

THE past season has been disastrous for the mountain woodlands. A cold spring was followed by a hot summer, almost rainless. The first heavy snow fell on October 30th and this extinguished many smouldering fires. But from the fifteenth of May until the middle of September, the hills were quivering in summer heat, and the many openings in the forest cover, made by lumbermen and tie cutters or by former fires, admitted the sun's rays to the rocks, which dried up grasses and sedges and undergrowth, and created conditions greatly favoring the spread of conflagrations.

The first large fire started at Ouray on July 8th. It was caused by hunters who had camped in the neighborhood of the Amphitheatre, one mile east of the town.

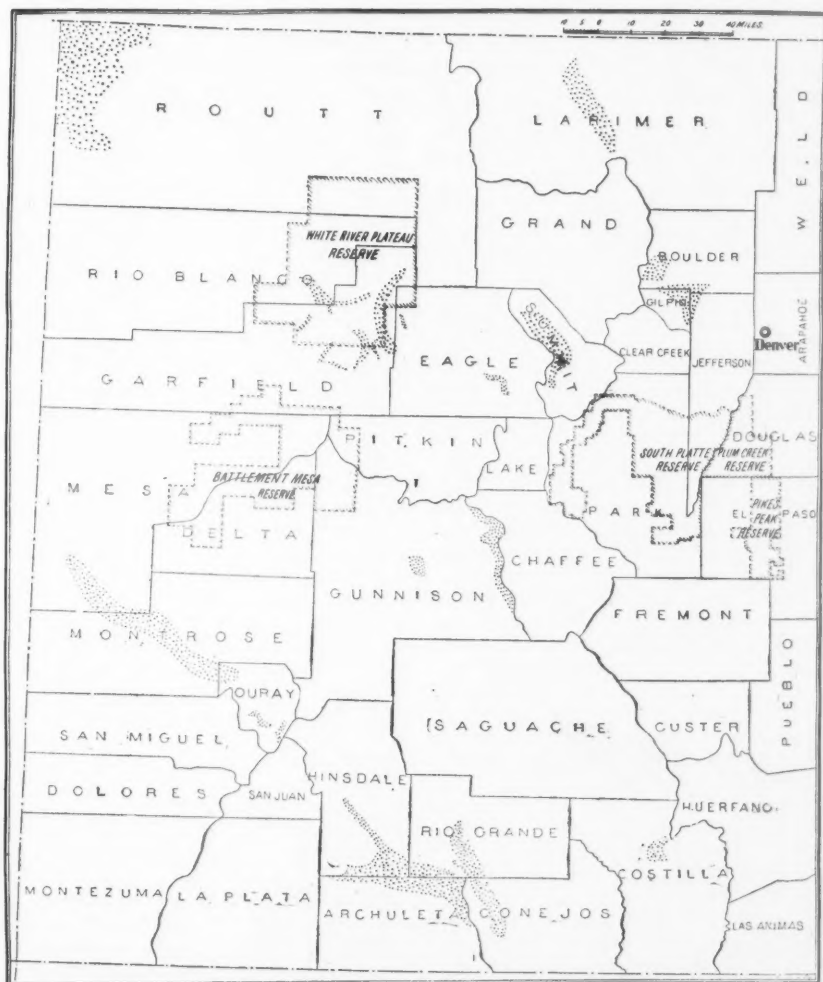
It spread over many square miles and went out for lack of fuel some ten days afterwards.*

On July 10th a conflagration began about six miles east of Eldorado in Boulder county, at the Caviness saw mill, located on the old Gregory trail, west of Magnolia post-office. The fire got beyond the control of the men at the mill and swept up the mountain side towards the Jack Pine mine. The hills were covered with

*No actual measurements of the burnt over areas were made, but the estimates here given are based for authority on the statements of forest rangers, surveyors, and well-known citizens of the regions where the fires burned. They underestimate the extent of the fires rather than exaggerate it. The statements of figures here given have further been submitted to a number of members of the State legislature.

a thick growth of Yellow Pine. The flames made rapid progress, running towards the Little Boulder Creek, over a stretch of country three miles wide by

waters of North Beaver Creek, two miles north of Rawlins, in Gilpin county, were ignited by campers. About eleven square miles of Pine forest were here destroyed.



MAP OF WESTERN COLORADO SHOWING THE AREAS (DOTTED) BURNED OVER IN 1900.

eight in length. A conservative estimate gives the loss of standing timber as amounting to seven millions of feet.

On the same day the woods at the head-

There were a number of small fires all over the mountain region during the month of July. In the White River Reserve about a thousand acres were burned over

at the headwaters of the South Fork of the White River. The effect of this was quite serious, as the territory was densely covered with spruce, pine and Balsam Fir, which protected the snowholdings upon the northern watershed. In the South Platte Forest Reserve, many incipient conflagrations were extinguished by the U. S. rangers, the total forest area destroyed here during the month amounting to only twenty-five acres. On July 31st the U. S. Supervisor of the White River Plateau Reserve, discovered a large fire in the Cañon of Grizzly Creek. It had a big start, and, the ground being very dry, the flying sparks set several fires afar off. The bed of Grizzly Creek being unapproachable (the cliffs on each side are some two thousand feet in height), efforts were made to cut off the course of the fire toward the north, in which direction lay a belt of magnificent spruce forest. By back-firing and trenching the burning was stopped after it had devastated about six hundred acres in the reserve, two hundred of which had green standing timber upon them, the other four hundred acres being covered with dead standing or dead down trees. In the meantime the heavy winds then prevailing cast brands over long distances into the Coffee Pot Springs woods, where about four hundred acres were burnt over, two hundred and fifty being green timber and one hundred and fifty acres grass land. With much labor this fire was subdued, to the saving of the much larger tract of spruce forest lying to the northeast of Coffee Pot Springs. Sparks were also blown into the deep cañons and heavily timbered gulches of Deep Creek, resulting in the destruction of a hundred acres of green standing and fifty acres of dead timber. At the same time a blaze came up over the cliff from the east side of Grizzly Creek and burned over some seventy-five acres of green standing trees, not only destroying a beautiful piece of Spruce forest, but also wasting the snowholdings which furnish the sources of Broken Rib Creek. The Lake Creek fire began August 16th in township 3 SR 87 West, igniting thirty acres of dead standing timber north and east of Lake Creek,

besides some twenty acres of grass land. It was stopped in its progress towards a large body of green timber by trenching. On the south and west the rangers prevented its doing damage by back-firing.

August 18th, a fire was discovered near "The Caves," on the South Fork of the White River in township 2 South Range 91 West, which ran over two hundred acres of Oak brush, doing little or no real injury to the forest, but threatening many thousands of acres of green spruce, pine and balsam timber upon the divide between the South Fork of the White and Grand Rivers. It was extinguished by rangers and the parties who had caused the trouble by neglecting to put out their campfires were placed under bond for appearance before the United States Grand Jury.

August 29th, ten acres of dead timber burned over in township 2 SR 88 West. This fire was put out by rangers who applied back-firing and carried water in canvass buckets, thereby saving five thousand acres of splendid green timber on the Trapper's Lake Trail. On the same day another fire commenced in township 5 SR 90 West, near New Castle, extending into township 4 SR 90 West, near Elk Creek, destroying fifty acres of green standing spruce trees.

August 31st, a grass fire was discovered at the mouth of Lost Creek in township 1 NR 90 West, which ran over a good deal of bottom land. The rangers extinguished it by back-firing and thus prevented it from getting into a fine forest of Spruce and Balsam at the headwaters of Lost Creek. The month of August was full of danger for the White River Reserve, and it is owing to the faithful work of Superintendent May and his men, that the Reserve exists in its pristine beauty at the present time.

From August 16th, until well into September, forest fires were burning fiercely in all directions upon the Black Mesa and the Uncompahgre Plateau, practically destroying all the timber growing on the divide between the Uncompahgre and San Miguel Rivers. Efforts to extinguish them were unavailing, the whole region was swept bare of trees.

August 3d a large conflagration raged in the heavily timbered country about Gothic, 35 miles north of Gunnison, destroying four thousand acres of pine and balsam forest.

About August 8th another broke out at the headwaters of Texas and Willow Creeks, affluents of the Taylor River, west of the Continental divide, in Gunnison County. The destruction wrought was very great, for the fire extended some fifteen miles in a northwesterly direction over a track six miles wide covered with magnificent spruce timber.

August 12th a fire started at the head of Silver Creek in Gilpin County and spread over a considerable area. Want of fuel stopped it; there is but little woodland left in Gilpin County.

August 16th, two fires originated on the South Fork of the Rio Grande, one east the other west of the river, within three miles of each other. The one on the west side burned up the mountain and stopped after reaching timber line, but that on the east side burned a swath from five to twenty miles wide, taking everything in its way driving several hundred thousands of cattle and sheep into the valley, and destroying mine buildings, machinery and shaft houses in the whole region at the headwaters of the Alamosa and Conejas rivers. The length of the path burned over was about forty-five miles. All of this devastation can be traced to sheep herders who, either carelessly or maliciously, left their logs burning on breaking camp.

On the same day a large fire was raging in the range of hills on the east side of the Blue River, a few miles north of Dillon, in Summit County. The county commissioners were in session, but did not authorize any action towards saving the timber. The result was a destruction of heavy pine and spruce forest that had covered an area twenty miles long and six miles wide, the greatest injury being done between the Blue River and Williams' Fork.

August 28th, a fierce forest fire raged on the mountain three miles northwest of Ouray, destroying about eight square miles of timber.

August 29th, a blaze was discovered on the west side of Sierra Blanca, making rapid headway. The western slope of the mountain was denuded.

August 30th, the woods fringing the entire northern boundary of Archuleta County were found to be ignited. A large fire was burning near the head of Four Mile Creek, the smoke resembling a huge cloud as it passed over Pagosa Springs. Some forty square miles of Yellow Pine forest were burnt over. It was asserted that sheep herders who fired the grass in order to improve the pasture for next year are responsible in this case.

Local conflagrations were also reported during the month of August from Eagle, Pitkin, Grand and Larimer counties, the Medicine Bow country west of the range, in North Park especially, suffering severely. The northern and western part of Routt County, lying outside of the White River Reserve, also lost many square miles of timber.

With the advent of September, local rain began to fall, and in many places the moisture was sufficient to prevent new fires from taking a start. But little was done anywhere to quench those burning outside of the Reserves, the State authorities being helpless for lack of funds and the employees of the United States working under a system of divided authority. The forest reserves, however were well protected, the result for the season being as follows:

1. Camp fires, left burning, extinguished before any damage was done	163
2. Fires (not included above), which had gained considerable headway before they were extinguished by forest officials (area burned over 361 $\frac{1}{4}$ acres).....	21
3. Large fires, requiring extraordinary effort, time and expense to extinguish (area burned over 10,002 acres).....	17
Total number of fires within the reserves	201

The area affected within the reserves was 10,363 $\frac{1}{4}$ acres. It consisted of live

timber destroyed, 2,115 acres; live timber partially destroyed 4,467 acres; undergrowth and dead timber 2,181 $\frac{1}{4}$ acres; grass lands 1,600 acres, which gives a total of 10,363 $\frac{1}{4}$ acres or about .0003 per cent. of the acreage contained within the reserves. This shows that the forest employees are doing most excellent work,

and that an efficient organization would be able to cope with the danger at large.

The area burned over, outside of the Reserves amounts to 865 square miles. The figures given in detail by counties are in the following table, which shows the forest condition of Colorado, December 31, 1900.

COUNTIES.	Area.	Forest Conditions from June 30, 1900.				Timber lands burnt in 1900.	Timber lands remaining Dec. 31, 1900.
		Forest lands.	Fire wasted.	Brush lands.	Timber.*		
Routt.....	8750	980	180	400	400	42	358
Rio Blanco.....	3600	150	15	45	90	25	65
Garfield.....	3250	300	103	151	46	25	21
Mesa.....	3000	910	200	320	390		390
Rio Grande.....	1260	576	60	216	300	205	95
Saguache.....	3240	1000	450	300	250		250
Gunnison.....	3200	300	60	80	160	90	70
Chaffee.....	1150	600	70	80	450		450
Lake.....	450	200	153	421	5		5
Pitkin.....	1120	746	77	520	149		149
Eagle.....	1600	300	60	195	45		45
Summit.....	690	200	34	66	100	44	50
Larimer.....	4100	1875	188	750	937	32	905
Grand.....	2100	700	90	375	235		235
Boulder.....	790	100	25	25	50	24	26
Gilpin.....	150	31	6	19	6	4	2
Clear Creek.....	390	261		215	46		46
Jefferson.....	740	318		205	53		53
Park.....	2100	900	150	300	450	42	408
San Juan.....	500	67	6	11	50		50
Custer.....	720	700		350	350		350
Conejos.....	1200	400		400			
Costilla.....	1720	750	225	300	225		225
Las Animas.....	4700	1400	25	1200	175		175
Archuleta.....	1100	624	24	300	300	40	260
Mineral.....	860	645	45	300	300	10	290
Hinsdale.....	960	600	50	400	150	6	144
La Plata.....	1860	525	75	400	50		50
San Miguel.....	1300	185	25	60	100		100
Delta.....	1150	72	9	54	9		9
Douglas.....	846	319	21	158	140		140
Teller.....	558	180	92	46	42		42
Fremont.....	1509	500	221	223	56		56
El Paso.....	2141	400	270	86	44		44
Pueblo.....	2700	160	80	48	32		32
Huerfano.....	2400	240	50	70	120		120
Montrose.....	2527	630	105	125	400	135	265
Ouray.....	680	280	40	40	200	34	166
Dolores.....	1180	500	50	250	200		200
Montezuma.....	2640	200	140		60		60
Total.....	74931	19824	3474	9185	7165	758	6407

* In the greater number of the areas classified "Timber," the yield would likely be from 3,000 to 5,000 feet board measure to the acre. Hence the money value at \$1.00 per thousand feet stumpage for 758 square miles would be at least \$14,553.60. But the stumpage value ought not to be considered as of great account compared with the enormous damage caused to the agricultural interests by the denudation of the watersheds.

There were, all told, at the beginning of the year 1900, only 6,000 square miles of forest left in Colorado, barely enough to protect the snow holdings and watersheds below timber line. It will be a serious matter for the valley farmers if this limited area shall be materially reduced. Already complaints that the climate is changing are being made. Domestic and stock water is scant during the late summers and the long, dry autumns. There has been a marked alteration of the volume of water in all streams flowing eastward. Formerly a nearly regular current flowed, moderately increased at times by rains or melting snows. In recent years, spring floods, with increasing violence, have overflowed the banks of the streams, washed away

and destroyed growing crops in the bottom lands, sometimes eroding the lands themselves. And every summer now witnesses a drouth. In 1899 the crops of Las Animas county were less than half an average for lack of irrigation. If the forest cover shall continue to be destroyed, it is safe to say that autumns of low water will cease to be exceptional, and become the rule, and the agricultural territory must shrink.

Forest fires can be avoided by an enforcement of laws and regulations already existing. It is to be hoped that this may be done during the next season. A relatively small increase in the number of forest employees and a rational management may preserve whatever forest growth remains in Colorado.

A "SNOWBREAK" FOR THE PROTECTION OF TIMBER PLANTATIONS.

By GEORGE L. CLOTHIER.

Division of Forestry.

THE tree planter on our northwestern prairies is compelled to contend not only with an arid, cold climate, but occasionally with the drifting snow. Although a large precipitation of moisture in the form of snow is usually very desirable from agricultural and silvicultural points of view, yet it sometimes happens in the valley of the Red River of the North and contiguous territory that the snow is a positive damage to the farming communities. This is especially true when the high winds cause it to drift and bury the rural homes and plantations.

The usual windbreak planted on the prairie farm is almost invariably located too close to the buildings. If there is no natural or artificial feature beyond the grove to hinder or trap the moving snow such a grove is a positive damage to the home and of no use in itself, since the melting and settling of 20 or 30 feet of snow will crush and break the trees until they are of no commercial value.

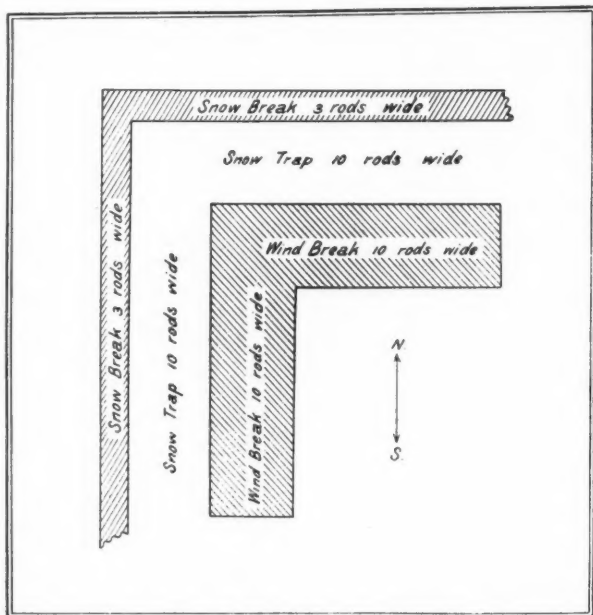
In order to insure their forest plantations on exposed situations against destruction from drifting snow, tree planters should grow artificial snowbreaks several rods to the north and west of their main groves. A snowbreak may be formed by planting 4 or 5 rows of trees and shrubs 8 or 10 rods to windward of the main plantation. This belt should usually take on the form of an L and the trees planted upon it should consist of species which may be broken or bent without serious injury to the life of the plants. An open space or "snow trap" should be left between the main plantation and the snowbreak. The snow will pile up and fill this space, if the precipitation be great, and when it melts in the spring the moisture will soak away into the ground and afford a source of supply for the trees during seasons of drouth.

In planning a snowbreak the planter should so select and arrange the trees that the species tallest at maturity will be on

the windward margin of the belt. A line drawn from the tops of the tall sentinels on the outskirts of the plantation to the tops of the trees on the inner margin, and touching the tops of the trees of each successive row, should form a downward curve. A good arrangement where the snowbreak is to be about two rods wide is as follows:

and fifth rows should be planted with the common Wild Plum.

The railway companies of the northwest could save enormous investments in snow fences if they would plant snowbreaks along the north sides of their rights of way. The plantation would require the condemnation of a little more land than is usually occupied by a railway, but in the



MAP OF A PROPOSED PLANTATION SUITABLE FOR THE DAKOTAS, PROTECTED FROM THE PREVAILING NORTH AND WEST WINDS BY A SNOWBREAK.

A single row of some stately species such as Bull or White Pine should be planted on the windward side of the belt. The next row, 8 feet towards the object to be protected, should consist of Red Cedar or Laurel-Leaved Willow. The third row should consist of Russian Wild Olive or Choke Cherry, and the fourth

long run it would be a great saving because it would be a perpetual improvement. The writer has been informed by Prof. N. E. Hansen, of the South Dakota Agricultural College, that the Russian Government is planting trees and shrubs for snowbreaks on a large scale along the the imperial railways in Siberia.

EXTERMINATION OF THE OAK AT LAKE GENEVA,
WISCONSIN.

BY JAMES JENSEN.

THE threatened destruction of the beautiful forest lands around the well known summer resort, Lake Geneva, Wisconsin, has become an important question to those owning houses, and passing the summer months at this place. In my profession as landscape architect, the opportunity offered itself to make a careful study of those causes destroying the great oaks in wholesale fashion.

The contour of the land is rolling, sometimes changing into abrupt grades towards the Lake or natural water courses. Gravel or gravelly soil prevails on the higher lands. On lower lands the gravel is covered by layers, varying in thickness, of hard pan in some instances, and of a gravelly clay containing some vegetable matter in others. Seemingly these layers have been washed down from the higher lands. The low lands along the natural water courses consist of black loam or decayed vegetable matter that, in some instances, becomes boggy; but this is of no special interest here, as it is on the gravel or clay lands that the oak has made its home. Close observation shows that trees growing on the "hard-pan" lands have suffered more than those on more porous grounds, and especially on lands turned into private parks, whether of gravel or clay substance.

Besides the oak, the Ironwood—(*Carpinus betula*) is gradually becoming extinct. The affliction is general; young and old are alike effected. Such varieties, or species as the Scarlet Oak (*Q. coccinea*), the White Oak (*Q. alba*), the Red Oak (*Q. rubra*), suffer most; whereas the Bur-Oak or Mossycup Oak (*Q. macrocarpa*), holds its own. The Pin Oak (*Q. palustris*) and several other species are not found in sufficient numbers in this district to permit satisfactory observation.

During the latter part of July and the first part of August last trees in supposedly healthy condition suddenly with-

ered as if struck by blight. In some instances this withering of the leaves was confined to certain limbs or branchlets only. Supposing that this sudden attack was caused by a fungus of some kind, I sent several leaves to Professor Bryon H. Halstead for examination. The reply was: "The oak leaves you send show some trouble but not so clearly that the diagnosis is satisfactory"; and he further suggested that the trouble might be at the roots, due to some change that lessened the subterranean water supply. Upon this suggestion several roots were sent; but neither in this instance could there be found any indication of the trouble prevalent. This satisfied me that fungus had nothing, or very little, to do with the extermination of the Oak; but that Professor Halstead's suggestion as to lack of water supply was correct, even if the roots did not indicate it.

The cause which led to this wholesale dying out is undoubtedly not of recent date; and to get at the root of the trouble it would be necessary to turn back for almost a decade.

The drouths of 1893, 94 and '95 are still fresh in the memory of every one engaged in agriculture or horticulture; the drouth being quite general over the country. Losses were great in both industries, especially on higher levels or near large cities where artificial sewerage assisted in the work of destruction. During those three years the earth dried out to a considerable depth. Then I noticed by digging a sewer that at a depth of ten feet or more the ditch was perfectly dry; when under ordinary conditions water could be found at a depth of three or four feet. Was it possible for trees to obtain sufficient moisture under such conditions? Assuredly not. And here we may look for the starting point of those causes destroying the oak forest at Lake Geneva and other points.

The prevalence of dead trees on the "hard pan" lands, previously mentioned, is attributed to the fact that after these lands got thoroughly dry, the oaks could not absorb sustenance from the ground as in the more porous clay or gravelly lands. Consequently little or no water was conveyed to the roots of the already dying trees. We must also remember the rolling topography of the land, which gives little chance for the absorption of heavy rains and is especially lacking in those agencies that assist in holding the water. Conditions of this sort were more prevalent on the so-called "improved" lands, where such beneficent agencies as undergrowth, in the shape of shrubbery or herbaceous perennials, and even the grass, had been cut off close to the ground. The outcome has been a larger amount of dead timber. Three years of drouth had dried out the soil to a considerable depth and very few roots were able to transmit moisture to the trees, which, cut off from their water supply, commenced to die. The trouble was first visible in the larger trees; showing itself in the dead tops; but to the close observer the majority of trees suffered, and the weak growth produced gave assurance of the trouble.

The deadly attack on the sturdy oak had not yet reached its limit. The climax came with the severe winter of 1898-99—not only a winter known for its extreme low temperature, but one that will long be remembered for its scant fall of snow. The absence of snow removed that protection which nature so wisely provides, and thus enabled the frost to penetrate the ground to an unusual depth. Here again the barren "cultivated" slopes suffered the most. The action of this severe winter on tree growth was in many instances identical with that of the great drouths of previous years.

Apparently the trees are inactive during the winter months, and to some extent this is so. As an illustration we may compare this natural rest of trees with the winter sleep of animals and, like the latter, the trees need nourishment to sustain life. Thus the trees require a certain amount of water. A certain amount of

evaporation is going on during the winter months, increasing in sunny weather and especially during the early spring. This evaporation becomes greater in trees retaining their foliage all winter, as, for instance, the evergreens; and one, therefore, often notices that those killed are badly damaged (browned) during the warm spring weather when the ground still remains frozen. When we talk about hardy trees getting "winter-killed" it does not mean a freezing to death through the structural tissues, but a disturbance in these parts caused by the impossibility of obtaining water through the solidly frozen, ground-enclosed roots, and partly through an uneven swelling and contraction of the wood, produced by excessive cold weather and sudden thawing. The latter can be noticed by the vertical splitting of the trunk, or loosening of the bark, and most often seen on short-grained or not over-hardy trees.

The causes that lead to the killing of soft woods or tender trees and shrubs are entirely different, and do not belong in this article. In most instances where a tree has been "winter killed" it will shoot up again from the roots showing that the latter do not suffer from severe frosts; and this again stands to show why Professor Halstead was unable to detect any trouble in the roots sent for examination.

Three years of drouth had left the trees that survived in a weak condition, and these were followed by an unusually cold and snowless winter, during which frost in exposed sections was carried down to such great depths that every root was embedded in a solid frozen mass. And this, continued till almost the first of May, a time when sap had commenced to flow and a supply of water was in great demand, proved too much for the oak, and hundreds of trees succumbed to an unavoidable death.

Some may ask, why were not those Oaks standing alone in cultivated fields killed? They are more exposed and still seem to thrive far better than their sisters in the forest. Indeed they do. And why should they not? The plow and harrow have brought life into the soil. Water

and heat are more easily absorbed and retained, and through cultivation close competitors have been removed and thus a larger area obtained to feed on.

Nature has wisely provided the forest with protection wherever it is needed and usually we find this the way of undergrowth. This canopy of vegetation serves in several ways. First, it protects the ground from the hot sun during summer; thus cooling the surface and decreasing evaporation. During the winter it forms a warm blanket preserving the moisture which is increased by holding secure the falling leaves and drifting snow and preventing the frost from reaching to any great depth. These actions jointly encourage root-action near the surface in thoroughly decayed vegetable matter and enriched mother soil. And here again we may rightly assume that why trees are found to die out faster on "improved" lands is also because that "root-action" that through the natural protection of undergrowth had been encouraged near the surface, fell an easy victim to continued drouth, after the brush had been removed. The remedy for solving this, too often, perplexing problem, would be: protection, cultivation, and during extreme dry weather, artificial watering. If insufficient water supply was not the cause of extermination of the Oak, why did the larger trees, those demanding a larger sup-

ply of water commence to die out first? Why did trees growing under more favorable conditions in regard to obtaining water, after the dead tops had been removed, start out vigorously again? Why did trees on slopes or hilly, exposed grounds, suffer, and those on low and moist lands, not?

Now as to remedying this: First, protection. This may be accomplished either by inducing a luxuriant undergrowth to cover the ground in the way of shrubbery or herbaceous perennials, or by permitting the grass to grow long in the fall. This would hold the falling leaves and drifting snow, and form a warm blanket which would prevent the frost from going to a great depth. It would also decrease evaporation from the ground during the winter and summer, and add moisture and fertility, which in return encourages root-action near the surface.

Cultivation makes the soil porous, thus permitting the heat and moisture to penetrate it. Heat and moisture are necessary to the formation of such chemical combinations in the soil as supply food to the roots and bring renewed life to the trees.

Besides, as before mentioned, cultivation increases the retaining of moisture. Where the forest is thickly wooded a thinning out will give more light and nourishment to the remaining trees, and thereby induce better growth.

REFINING MAPLE SAP.

THROUGH the courtesy of Col. Wm. F. Fox, an illustration which appeared in his article entitled "A Forest Product," in the third report of the New York Forest, Fish and Game Commission, is reproduced on the opposite page. The photograph shows the rude method of boiling maple sap which is now fast disappearing, just as the practice of gashing the tree with an axe has given way to that of boring a hole now usually less than one-half an inch in diameter. Col.

Fox describes the once common process of which this picture illustrates as follows: "In boiling the liquid and reducing it to sugar, a large potash kettle was generally used. This was hung on one end of a long pole, to the other end of which weights were attached as a balance, so that the kettle could be easily swung off or on the fire as needed. The fire, kindled with strips of Birch bark, was replenished with large sticks or small logs of green wood, that were cut as fast as wanted, few



SUGAR BUSH. BOILING MAPLE SAP IN KETTLES. ONE OF THE OLD WAYS BUT IN USE YET.
BARRELS AND TUBS ARE USED TO STORE SAP.

of the sugar makers taking the trouble to provide a stock of dry fuel for the purpose. No shed or house was used, but the work was carried on in the open air, in all kinds of weather, rain or snow, wind or calm, storm or sunshine. Smoke, steam and falling cinders surrounded the boiling kettle, discoloring and flavoring the product accordingly. By constantly adding to the contents of the kettle the sap was boiled from early morning until late at night. The scum and various impurities rising to the surface were skimmed off as fast as they appeared. Small quantities of milk or white of eggs were thrown into the kettle from time to time to clarify the syrup and by coagulation assist in bringing the impurities to the surface, an old-fashioned practice still adhered to by many sugar makers. Whenever the liquid was liable to boil over, a lump of fat pork or small piece of lard was thrown in to prevent this. Some sugar makers prevented the overflow by an automatic arrangement which consisted in hanging a piece of pork over the kettle within a few inches of the boiling sap; and some accomplished the same result by greasing the rim of the kettle with lard. The test of granulation was usually made by pouring some of the boiling syrup on the snow. If it 'waxed,' and on cooling became brittle, the time had come to 'sugar off.' Sometimes a twig, bent and fastened at the end into a loop, was dipped into the boiling mass; if a film would form across the opening with enough tenacity and elasticity to stretch outward when

blown upon, the test was deemed satisfactory."

Now improved appliances and more intelligent methods are everywhere resulting in greater economy of production, and a much purer product. Of this Col. Fox says: "The complaint is often heard that maple sugar is adulterated, and that it lacks the true maple flavor of the old-fashioned product. The genuine article as now made is so different in color and taste from the product of former years that the consumer is suspicious of its purity. But the 'true old-fashioned' flavor was too often due to impurities, not purity. The peculiar taste was caused largely by sour sap, burned sugar, smoke, cinders, leaves, bark and the rain or melted snow that dripped from the trees into the open tubs and buckets. People acquired a taste for this compound, just as they learned to relish other unwholesome articles of food. On the other hand, the efforts to produce an absolutely pure article has resulted in a whitish, hard, flinty cake in which there is little left of the maple taste.

"The refining process may be carried too far. A pure article that is merely sweet will not satisfy the consumer. Cane sugar is equally sweet and costs only half as much. The extra price for maple sugar is paid in order to obtain the delicious flavor peculiar to that product. The work of refining should cease as soon as the impurities are eliminated, in order to retain as far as possible the distinct taste of the maple."

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The Forest Agitation in New Hampshire.

Since the last FORESTER went to press an association named "The Society for the Protection of New Hampshire Forests" has been organized at Concord (N. H.), and Ex-Governor F. W. Rollins, has been elected its president; Joseph T. Walker, of Concord, its secretary. Its constitution and a full list of its officers will soon be published. Meanwhile, largely as a result of the agitation from which the Association has sprung, a number of forest bills have already been introduced into the State legislature. That they are being killed off fast in the committees is of little importance for such was almost sure to be their fate. They are interesting enough simply as the first formulated expressions of a long hoped-for movement which has taken shape very rapidly during the last six months, and which is now producing a State association. Taken together they express a simple and yet fairly complete State policy with regard to the forests—one which involves the establishing and management of a State reservation, the discouragement of clean cutting, and the fostering of investments in forest growth through the lessening of taxes. This policy is sure to be adopted ultimately.

For there are places in the White Mountains in which public ownership is as much an essential condition of the region's permanent attractiveness and prosperity as anywhere in New York or Massachusetts. The method of cutting off the small trees with the big and then deserting the land to fire, which is still practiced by many lumbermen, is generally both shortsighted from the point of view of whoever owns the land, and bad from that of the community. And lastly, so to distribute taxes as to discourage needlessly an industry which would interfere with no other but would fill a vacancy, shows only improvidence. On all these accounts the substance of the bills which have failed in the State legislatures this winter, must become a reality in New Hampshire in time. The sentiment of the State, as soon as there is any worthy of the name, will demand it, but whether in all things by way of the statute books may be doubted. For instance, a law restricting the cutting for sale of soft woods to trees ten inches or over in diameter, two feet above the ground—such is one of those before the legislature this winter—could never be enforced beyond the point up to which the sentiment of the community was actively in favor of it, and up to that point it would be needless. For the present it is good to see this sentiment being aroused both by the discussion of proposed laws and by a promising association.

An Example to the Point.

Just as the legislature of New Hampshire is being asked to pass a law to prohibit the cutting for sale of pine, hemlock, spruce and fir trees, under ten inches in diameter, there has come to our notice a "Contract for Cutting and Hauling Logs" according to which the Great Northern Paper Co., of Maine, is having its lands lumbered. This company is one of the largest owners of spruce in the northeastern States, and the contract shows that it has decided of its own accord to do about what some people in New Hampshire would have their State require by law. This contract is evidently based on

Messrs. Pinchot and Graves' publications on the Adirondack Spruce, and stipulates, briefly, that where the company contracts for cutting, operations shall be carried on so that a future supply of trees can be counted on. The most notable clauses in this contract demand that:

All trees shall be sawed and not cut, shall be sawed as close to the ground as practicable, and in no case shall a stump be left higher than the diameter of the tree where sawed, plus six inches.

That where there is three feet or more of snow, each tree shall be shoveled out before sawing. That trees smaller than — inches in diameter at the stump shall not be sawed or hauled, except small trees that may be cut in swamping, and that these are to be hauled as small as five inches at the top end, whatever length.

That no Spruce or Pine shall be used for bridges, roads, skids, slides or other purposes where other timber can be had, and that all merchantable timber used for skids, slides or other purposes shall be hauled and delivered.

That all trees shall be run up into the tops and well trimmed before being cut off, and

That the person contracting to do the cutting shall carefully guard all fires kindled by him or his employees so that they shall not spread or cause injury, and shall keep the Forest Commissioner's notices in regard to fires posted conspicuously.

In other words the Great Northern Paper Co. wishes to have what is forestry of a rough sort practiced on its lands. A man who knows the New England lumber business intimately said recently that three-fourths of the lumbermen of New Hampshire were trying to do likewise. The moral of this is that individual initiative may go far toward effecting what the law which has just failed of passage could scarcely have accomplished. A wise and well equipped forest commission might, through such work as the Agricultural Boards have been doing, produce a state of things in New Hampshire in a comparatively few years such as no mere legislation either now or later could hope to bring about.

A Forest Department in Pennsylvania.

The Pennsylvania Legislature passed an Act last month which raises the Division of Forestry of that State's Department of Agriculture to the position of a Department of Forestry. In addition to the new importance which is thus given to the forest service of the State, the efficiency and strength of its organization is much increased by the Act. The department is to consist of a Commissioner of Forestry, and four others. These shall also constitute the State Forestry Reservation Commission. The Commissioner is to hold office for four years and so are his fellow members of the Reservation Commission; they are not all to be appointed at the same time however, and their terms of office so overlap that the Board will always have two members of two years' experience. The Reservation Commission is empowered to buy lands for the forest preserve, to manage them, to sell timber, and to make contracts for the mining of any valuable minerals which may be found in them. The Act further specifies that the Commissioner of Forestry shall be the President and executive officer of the Forestry Reservation Commission, and also Superintendent of the State Forestry Reservations, and shall have immediate control, under the direction of the Commission, of all forest lands belonging to the Commonwealth. He is empowered to execute all rules adopted by the Commission for the enforcement of laws designed to protect the forest from fire and depredation, and is also empowered to employ detective service and to make arrests. It is also provided in this Act that the kindling of fire on a forest reservation, except in accordance with the rules and regulations of the Commission, shall be a misdemeanor for which the penalty is a fine of not less than one hundred dollars, or more than five hundred. Governor Stone has just appointed Dr. J. T. Rothrock as Commissioner. No State has passed a more thorough or broadly founded Act than this, and none has a more conscientious or more vigorous Commissioner. The Act shows what a Commissioner and State

forestry association can in time accomplish; for there can be no doubt that Pennsylvania's present treatment of her forests is due chiefly to the patient and persistent work of Dr. Rothrock and the other officers and members of the State Association.

Results of the Congressional Session.

The short session of the last congress has adjourned and a number of measures which it was hoped would be passed must still wait for another year. First among them are those looking toward the purchase of the Calaveras Grove, the investigation of the Minnesota Park project, and the establishment of a Southern Appalachian Forest Reserve. The proposed Appalachian Reserve has been surveyed and reported on at the desire of congress, has been recommended by the Secretary of Agriculture, and has been voted on favorably by the Senate. It is safe to say that only the great pressure of other business prevented the House from voting in its favor this year. Some ground will have to be gone over again but it needs no prophet to see that though its friends failed of success this year this reserve will in time be established. Of the Calaveras Grove and the Minnesota Park less can be said. In spite of the efforts of those who are trying to have the Minnesota park question voted on it was hardly mentioned during this session of Congress and on the two or three occasions when it was, nothing was done. An act for the purchase of the Calaveras Grove passed the Senate but was opposed in the House. In the same way the different measures which belong, perhaps, more particularly to the field of irrigation fell through. The Pima Indian appropriation, carrying \$100,000 for irrigation investigations and works in the Southwest failed of passage at the very end of the session, as did likewise the different measures attached to the River and Harbor Bill. Nor was there any increase in the appropriation for the Hydrographic Division of the Geological Survey.

But in spite of what the 56th Congress has not done the year need not be looked upon as one barren of results. The session was a very short one and one unusually full of important business. Besides, much persuading and explaining, which goes with everything as new as forestry and irrigation, will not have to be done over again. And finally the increase in the appropriation for the Division of Forestry from \$88,520 to \$187,240 and the promotion of the same Division to the standing of a Bureau, a measure which was threatened with failure at first but which passed without difficulty, are notable steps in advance.

Legislation about grazing.

An amendment to the "Sundry Civil Expenses" bill was proposed last month providing: "That any person residing within the limits of any forest reservation, or any person who did reside therein at the time of its creation, or whose live stock had ranges within the area covered by such reservation prior to its creation and still ranges within its limits, shall be permitted to graze live stock continuously within the limits of such reservation upon the condition that he will at all times use his best efforts to prevent the starting and spread of forest fires in the locality in which his stock ranges." Although the Department of Agriculture is even now making a thorough and careful investigation of the grazing question this amendment passed the Senate with but little modification.

The chief trouble with this amendment is that whoever framed it did not provide adequately against the depravity of those who apply the letter of the law rather than its spirit. The amendment should be more explicit. After "still ranges within its limits" there should be inserted "or whose relatives and friends resided in said reserve, or had live stock ranging therein, or any of whose herders had ever pastured stock on the reserve." Its meaning would then be reasonably plain.

NEWS, NOTES, AND COMMENT.

How Forestry Differs from Lumbering.

The following definition of the difference between forestry and lumbering is quoted from the article by Mr. O. W. Price, of the Division of Forestry in the Report of the New York Forest, Fish and Game Commission:

"A working plan is, first of all, a plan for lumbering. It specifies the diameter limit to which trees shall be taken, and includes estimates of the yield. It fixes the areas to be logged over, forecasts the profits to be realized, and sums up the whole situation from a business point of view. In so far, it treats of what is to be done in the forest entirely from the standpoint of the lumberman, and it is based upon the same study of local conditions that any good lumberman makes before he fells a tree. The lumberman's working plan, however, generally considers only the most profitable way of harvesting the merchantable timber. The forester's working plan is made with a view also to the removal of the mature timber in such a way as to hasten the production of a second crop. In spite of much that has been said to the contrary, there is no other radical difference in purpose between the two. Both wish to make the forest pay as high an interest as possible upon the capital which it represents. The lumberman is usually content to receive returns only once from the same area. The forester lumbers with a view to lumbering again. Exactly the same study of the quality and amount of merchantable timber, of the conditions for its transport, and the market open to it for sale, is necessary under lumbering and under forestry."

Of the introduction of forestry on the New York State Preserve, Mr. Price concludes:

"Systematic forest management should show good results upon the New York State Preserve. Practical forestry has been proved in the Adirondacks and has been found to pay. It will pay also upon

the Preserve, both in money and in those indirect returns which will result from the maintenance of so large and important a body of forest land and the production of a steady supply of timber.

"Until the repeal of the clause of the 1894 amendment to the State Constitution which prohibits all cutting in the New York Forest Preserve, the application of practical forestry will naturally be impossible. This clause entails an annual loss to the State equal to the amount of timber which goes to waste each year. It cuts off entirely what might be made an important resource, and it does not tend to the improvement of the forest itself. When it was passed there was some reason to fear that if lumbering were once begun upon the Preserve it might be difficult to regulate it. The State is now in a position, however, to base the management upon conservative methods and to see that they are carried out."

Burning Brush and Forest Fires.

"The most frequent causes of woodland fires in our State (New York) are the small fires started by farmers for the purpose of burning brush, logs and stumps, in order to clear some piece of land. These are known locally as fallow fires, and the operation is generally alluded to as burning a 'foller.' This work as a rule is carelessly done, and as the farmer always selects a dry time in order to get a good burn, as he terms it, the fire escapes too frequently into the adjoining forest. Having piled the brush and logs into heaps for burning, the farmer seldom employs any extra help to guard against the escape of the fire, and so when a breeze springs up, as is very apt to be the case, he is unable to control the flames or prevent them from being driven into the adjoining woods. Too often he is known to set fire to his brush heaps and then go away to attend to other work, leaving the fire unwatched. Nearly all

the burned areas in the Adirondack region are due to the carelessness of men employed in these petty agricultural operations."—*Fourth Annual Report of the New York Forest, Fish and Game Commission*, p. 329.

Long-lived Trees for Plantations. In good part owing to the efforts of the section of Tree-planting of the Division of Forestry interest in tree growing has been increasing rapidly in the region of the upper Mississippi Valley. An agent of the Division has recently returned from that region, and reports that the farmers in the territory west of the Mississippi and north of the 40th parallel of latitude are awakening to the importance of planting trees, especially for economic purposes. The planters are anxious to avoid the mistakes made during the operation of the Timber Claim Act. The groves now being planned are designed to be permanent features on the homesteads.

To that end, the farmers will use a greater proportion of long-lived slow-growing species than formerly. The demand for such hardy, drouth resisting species as the Hackberry, Green Ash, White Elm, Bur Oak, Red Elm, Red Cedar, and Rock Pine (Bull Pine) promises to be greatly increased during the next few years. The greatest present difficulty with which the prospective tree planter has to contend is the fact that commercial growers of nursery stock are not supplied with this kind of material. The nurseries still carry large quantities of the short-lived kinds, such as Boxelder, Cottonwood, Maple and Willow, but are short on the more valuable species.

The planting of conifers on the prairies of the West during the past has not been attended with general success. This is partly owing to the use of eastern and introduced trees which are not adapted to the country. There is abundant evidence, however, that the Red Cedar and Rock Pine (Bull Pine) will thrive throughout this section. The desirability of evergreens for wind-breaks on a bleak prairie

should lead owners to turn their attention to these hardy native species.

Mr. Wadsworth on the Forest Commission. At the request of the Editor of *Forest and Stream*, Mr. A. W.

Wadsworth, President of the New York Forest Fish and Game Commission, has expressed his views on the commission and its work in a letter in which the following paragraphs refer directly to the forests.

"In answer to your request for my views on the subject, I beg leave to say that I think that the Forest, Fish and Game Commission is an anomaly as at present constituted, for reasons given under the following heads.

"The Commission is supposed to have charge of the State lands, amounting to hundreds of thousands of acres (1,384,128) valued at over ten millions of dollars, yet divided into nearly six thousand separate lots (5,974), some covered by valuable timber, subject to forest fires, decay and death; others miles away from the rest, surrounded by hotels and settlements, useless for game, timber or water supply, but of great value for lease, sale or exchange.

"But the Commission can make no rules regarding them beyond the laws enacted. The Constitution prohibits the leasing of land or even the giving away of dead timber, and the Legislature allows but three foresters to look after this property.

"At such time as the people feel that they can trust their officers and will withdraw the constitutional provision regarding them, the State forests should be put in charge of an unpaid Commission, not to exceed three members, who should have absolute jurisdiction within their limits on all matters pertaining to them, such as water supply and pollution, game refuges and protection and the control of camping parties. They should also be empowered, under proper restrictions, to exchange, lease or sell outlying lots, and to practice forestry in a proper and conservative manner under a well defined plan, and should be allowed sufficient force under their own control to do so."

Forestry in the South.

Interest in scientific forestry is rapidly increasing in the South. A preliminary examination has been made by the Division of Forestry of the U. S. Department of Agriculture of the large forest in Polk and Monroe counties, Tennessee, owned by Senator George Peabody Wetmore, of Rhode Island, and examination has established the suitability of this tract for sustained forest management. Work will now be begun and pushed in making a working plan for the forest, which contains 84,000 acres of hardwood timber.

The Division has also received from the South two other important requests for expert assistance in forest management. The first is from the Okeetee Club, which owns 60,000 acres of Shortleaf Pine land in Beaufort and Hampton counties, in South Carolina. Mr. Overton W. Price, Superintendent of Working Plans in the Division of Forestry, will make a preliminary examination to ascertain whether a working plan for the tract is feasible. In addition to Shortleaf Pine, this tract contains Cypress in the swamp lands, and also some hardwood timber. The Okeetee Club's tract borders on the Savannah river, with markets by water and rail at no great distances. The other request to the Division for assistance comes from northwestern Georgia, where a preliminary examination of 16,000 acres of Shortleaf Pine is wanted.

Massachusetts Wood Lots.

"There seems to be little doubt that, for the present at least, White Pine is the best timber crop for the average Massachusetts farmer. The wood is always in demand, having no substitute at all comparable to it, and our supply of the first-class article is in this State (Massachusetts), as largely elsewhere, nearly exhausted. White Pine springs up readily almost everywhere on worthless pasture land or sandy wastes where hardly anything else of value can grow. Among the Berkshire hills it appears to be the only antidote for the all-encroaching shrubby cinquefoil, crowding out the pest when

nothing else avails. Everywhere it seems begging to show what it could do with only a chance if man were not too obtuse to take the hint. There are thousands of acres of this poor cheap land in Massachusetts lying idle or growing up with young Pine which farmers often take more pains to destroy than all the labor they would need to put into its cultivation, cutting and burning it over to get for their cattle a barren pasturage not fit for goats. With a small investment of labor and capital all this land might soon yield a good revenue both to its owners and to the State, except by the seashore, where, affected by the salt water, White Pine will not grow, and there its place is taken by Pitch Pine, which also might be turned to better account than it is. White Pine, too, yields perhaps the quickest and largest returns of any valuable timber tree in this State, and there is little risk in its cultivation except from fire. But when land owners all over the State are raising high-priced timber, public sentiment will demand more stringent laws for the prevention of forest fires and will see that they are executed."

"While clearing out old and inferior growth from the wood lot the remaining trees, the crop to be cultivated, should be thinned and thin bare spots be filled in by planting or natural seeding. A natural woodland properly managed should more than double its value in twenty years, when many of the larger trees will be ready to cut at a good profit, while the wood taken out meanwhile by weeding, thinning, and pruning yields just as good a return as though cut in the ordinary way, merely for its own value."—Mrs. M. L. Tucker in the *Transactions of the Mass. Horticultural Society*. 1900. Part I.

More Forestry in the Adirondacks.

Among the recent applicants to the Division of Forestry for advice and assistance in the management of its woodlands is the Moose River Lumber Co., which owns a tract of 16,000 acres in the Adirondacks (N. Y.). This tract is mostly spruce land and is situated

in Herkimer County. The preliminary examination has already been made by one of the experts of the Division of Forestry and the working plan will be prepared this spring. It will contain estimates of the present and future yields of timber on the tract, and will also make recommendations regarding the lumbering. This application, taken with those which have been received from other owners of private forest lands in the Adirondacks during the last two years, brings the total area of private land in that region, for which working plans have been requested up to more than 400,000 acres. On 140,000 acres these plans are already in operation.

✱

"The death is announced in his seventieth year of Dr. Bernhard Danckelmann, for the last thirty-five years director of the Prussian Royal Academy of Forestry at Eberswalde. He was one of the first to advocate the training of foresters in special colleges, and was the author of important works on forestry."—*Science*.

Dr. Danckelmann was the editor of the *Zeitschrift für Forst- und Jagdwesen*.

✱

Work of the Philippine Forest Bureau.

The Division of Forestry of the U. S. Department of Agriculture has selected from its working force two trained lumbermen with some knowledge of forestry, to be sent to the Philippine Islands in compliance with a cable request from the Taft Philippine Commission. The persons selected for this work are Mr. Grant Bruce, formerly a State forester in New York, and Mr. Edward Hamilton. Both of these men are expert lumbermen with some training in forestry, and have been selected in view of their special fitness for the Philippinework.

The preliminary forest work in the Philippines has been carried on by a Bureau of Forestry which was established in April, 1900, with Capt. George P. Ahern, Ninth United States Infantry, in charge. The work of this Bureau has convinced the Taft Commission of the great importance of the timber lands as a natural source of wealth, and of the neces-

sity of putting the Bureau on such a footing that it could handle the woodlands properly and effectively. Furthermore, it is evident that the cutting of timber under proper regulations will provide a large and increasing annual revenue. It has been found necessary to permit the cutting of timber to supply the present pressing needs, but care has been taken at the same time that the cutting should be done in a manner that would work no injury to the future growth of the forests. These considerations led the commission to cable to Washington for trained foresters to assist in putting the service on a more satisfactory footing.

Under the Spanish administration the timber lands of the Philippine Islands were in charge of a Department of Forestry which was organized in 1863. The personnel of this Department was made up of expert foresters, rangers, clerks, draughtsmen, etc., the higher officials being selected from the Spanish Corps of Engineers.

After Captain Ahern was appointed he received authority to employ a small number of foresters, rangers, and clerks; by September his office force had been doubled, in order to handle the work of the Bureau properly. The call for activity on the part of those in charge of the Bureau of Forestry was emphasized at once by the lumber famine in Manila and other important towns, owing to the destruction of buildings in the war, and the increased demand for good dwelling houses resulting from the large influx of Americans. For these reasons the felling of trees and the marketing of lumber had to begin soon after the establishment of the Bureau. Captain Ahern is in constant communication with the Division of Forestry, for assistance and coöperation with the Philippine Bureau of Forestry.

The work of that Bureau was confined for some months to the Island of Luzon, but recently it has been carried to other points in the Archipelago. The present plan is to cover all the important forests as the development of the working force will permit. One great difficulty which is delaying the work of the Bureau, is the

lack of capable and active subordinate officials. It is difficult to find men familiar with the forest conditions and the uses of the woods of the Philippines, who are entirely satisfactory in other respects. It is believed that the best means of securing a competent and efficient force is to employ new men and train them on the ground as speedily as possible. In this work Messrs. Bruce and Hamilton will be able to render valuable assistance.

The Bureau was recently reorganized so as to consist of an officer in charge, an inspector, a botanist, a chief clerk, and stenographer, a translator, a law clerk, a record clerk, 10 assistant foresters, and 30 rangers. It is the intention of the officer in charge to work up a forest service on the lines of the work carried on in the U. S. Department of Agriculture, through its Division of Forestry. The wholesale destruction of timber will be stopped, and the cutting will proceed under regulations looking to the future yields of the forests. The fire question will also receive close attention.

Mr. Bruce and Mr. Hamilton have sailed from San Francisco for Manila on the transport *Indiana*.

Two Lumber Journals on Forest Methods. "It is time that in this country, at least in locations where the timber is to be had, the lumber business should cease to be a matter of this year and next, and it should cease to be a short term of destructive enterprise and be a permanent investment such as would attract trust funds or any capital which desired a long term safe investment; inasmuch as it is as safe as any that can be imagined—safer if possible than government bonds, and will pay a better interest."—*The American Lumberman*.

"Two things impress themselves upon the mind in this connection. One is that both private holders of timber lands and public officials should become interested at once in practical forestry methods and aims as exemplified in the work of the national government through its division of forestry. The other is that owners of

timber lands should realize more fully than ever before the inevitable future enhancement in the value of their holdings. Such a realization will do much to prevent waste and the rapid manufacture of trees into lumber when the price of the latter is depressed. This, with care and proper laws to protect the timber against depredation and fire, will do much to prolong the integrity of our forest resources."—*Lumber Trade Journal*.

Report of N. Y. Forest, Fish and Game Commission. The New York Forest, Fish and Game Commission in its recent annual report to the Legislature, made the following recommendations:

1. That the Constitution be so amended as to provide for the practice of conservative forestry on State lands (a vast estate of 1,384,128 acres, of a value variously estimated at from \$5,000,000 to \$10,000,000, of which this Commission has sole care and control, and which it must protect from damage by trespass, fire and poaching), and the sale of dead, dying or mature timber under proper safeguards.

2. That the excellent work done by the United States Government in connection with our foresters, as shown by the report of the United States Forestry Department, herewith submitted, be continued and an appropriation of \$3,500, as requested, be made for that purpose.

3. That a force of rangers be appointed for the prevention of forest fires, timber stealing and poaching on State land.

4. That all town fire wardens be allowed a moiety of the fine in criminal actions, after payment of expenses, in cases where they can secure evidence that will lead to conviction for setting forest fires.

5. That the Board be allowed to set aside certain limited portions of the State lands as game refuges, and absolutely to prohibit the killing of wild animals therein.

6. That the anti-hounding law be permanently extended, and that no dogs of a breed which will pursue deer be allowed in the woods at any time.

7. That the killing of does be prohibited at all times."

"Above all, we would especially call your attention to the difficulty of enforcing the law in regard to the pollution of streams. This is a matter of vital importance and not to be dismissed as affecting only the lives of some fishes, the pleasure of some anglers or the dividends of some pulp mills. We are a water drinking people, and we are allowing every brook to be defiled. Nature provides that they should be kept pure by animals which feed on the dead matters which fall into them, but the chemicals

with which they are polluted can destroy all forms of life, so that every beast which dies in the mountains will soon roll down into our reservoirs, pickled in acids which no fish or bacteria can touch and live. It is not necessary to destroy or hamper any industry in order to prevent the pollution of water courses. What is really needed is to check the criminal selfishness of those who would rather poison their fellow citizens with their offal than to spend a few dollars to take care of it."

RECENT PUBLICATIONS.

The Lumber Trade of the United States. By O. P. Austin. From the Monthly Summary of Commerce and Finance for November, 1900. Bureau of Statistics, U. S. Treasury Department.

This publication meets a want which has been strongly felt by persons desiring information about the lumber trade, and it should be welcomed by every student of economics, as well as by lumbermen and foresters. The author has brought together in a well arranged form all the available facts and figures about the lumber trade, presenting his conclusions in a straightforward, business-like way. Uniform statistics of the lumber business are difficult to secure except for the large centers of production. In other regions estimates of the annual output, of the number of mills in operation, of the capital invested, etc., are in most cases available only for certain years or are altogether wanting. However, the formation of lumbermen's associations, whose reports are published in the various lumber journals, is tending to simplify the collection of such statistics. Mr. Austin has drawn largely upon these sources for the facts concerning production of timber in various parts of the country. His tables, comparing the output of lumber for home and foreign consumption, are exceedingly instructive and are most valuable because this information has hitherto been too scattered to be readily available to the average economist.

General conclusions regarding supplies of standing timber are extremely difficult to make. No accurate information exists regarding the amount of timber over extensive areas and estimates for whole States or for the entire country must be broad guesses. Still more unsatisfactory are any attempts to predict future supplies, for there is an almost total lack of knowledge of the amount and condition of young timber in the

United States and of the growth of the various trees under different conditions. Mr. Austin is wisely conservative in his statements respecting these points. For the total stand of merchantable timber he quotes Dr. B. E. Fernow, who places the amount at 2,300 billion feet. The total annual output of lumber is quoted from the *Lumber Trade Journal* of New Orleans as 40 billion feet. In discussing future supplies the author quotes from the reports of Mr. Henry Gannett.

It is hoped that this valuable publication may be followed from year to year by others of the same character.

H. S. G.

The Fourth Annual Report of the Commissioners of Fisheries, Game and Forests of New York State—1897.

This is the fourth of the large and profusely illustrated annual reports of the New York Forest and Game Commission. The articles which refer more or less directly to the forests or wood industries are nine in number. Of these the report of the Superintendent of State Forests is naturally the first, and is followed by the regular reports on the production of timber in Northern New York, and on Forest Fires in 1898, both also by Col. Wm. F. Fox. The last two are much like those which appeared a year ago; the most interesting part of the "State Superintendent's Report" are the recommendations, and of these perhaps the most important concerns the State's title to lands in forest preserve. It seems that there are still the many parcels of land in the reserve which are occupied by farmers, and according to the present requirements of law, the occupants pay the taxes. But of these lands a good part are forested and should belong to the State reserve. Experience has shown that to have these lands assessed to the occupants makes it difficult under certain circumstances for the State to secure an unclouded title to them. It is therefore urged

that the law be amended so that "all the land in the Forest Preserve, together with whatever buildings or other public improvements may be there, should be assessed to the State." * * * True farm lands would in no way be interfered with by this, but the timber producing areas within the preserve might thus more easily be secured to the State. The importance of this is increasing annually—more rapidly than ever now that the market for hardwoods is improving,—for:

"So long as the operations of the log jobbers are confined to the removal of one or two species the protective character of the forest was not seriously impaired. But with the advent of these other industries, requiring more or all of the species growing there, it is evident that large areas of standing timber are threatened with extinction. It becomes more imperative each year that the State shall acquire the territory in order to prevent such results, and also to inaugurate some conservative forest policy whereby it can supply the people with this much-needed product without ruining the source of supply. To accomplish this the State must first acquire the land by purchasing them as fast as they are offered for sale; and this can be done gradually without interfering with industries already established."

A paper by Dr. B. E. Fernow of the Cornell Forest School entitled "Adirondack Forestry Problems," is an enlarged edition of an article which appeared under the same title in *THE FORESTER* for October, 1900. The paragraphs in this report which are new, explain the work on the plantations of the Cornell tract, and criticize what Dr. Fernow calls European methods of forest management in the Adirondacks. These passages, he makes it plain, are meant for the work of Messrs. Pinchot and Graves and of the Federal Department of Agriculture. We by no means agree with them, and it seems somewhat strange to find them printed in the same volume with a paper on the "Working Plans for the State Preserve," by O. W. Price, the superintendent of working plans in the Division of whose present methods Dr. Fernow so disapproves. This last article should be, to those to whom forestry is an unfamiliar field, the most suggestive article in the volume. We commend it to all who are interested in this present question of allowing cutting on the New York Preserve.

Two articles on the "Sanitary Benefits of the Adirondack Forest," and the "Adirondack Cottage Sanitarium," by Dr. E. L. Trudeau, describe the results in curing and arresting consumption which have thus far been obtained at Saranac Lake. These have an especial interest in this connection now that the State of New York has decided to undertake the institutional treatment of tuberculosis. Of the remaining papers that of the State Entomologist, Dr. E. P. Felt, on "Insects Injurious to Forest Trees," has already been noticed in *THE FORESTER* for November, 1900.

Dr. John Gifford's paper entitled "Forestry on Sandy Soils," deals with a subject about which little of value has been written in this country. Dr. Gifford's ability to deal with it is already known to those who have read certain of his earlier articles and his report on "Forestry on the Coastal Plain of New Jersey." The drift of his paper is indicated in the first sentences: "There are vast areas of sand lands throughout the Eastern United States, especially along the coast and in the neighborhood of the Great Lakes. They exist in such quantities and are in such a deplorable condition that their treatment should be a matter of national concern. Sand lands may for a time produce good agricultural crops, but for reasons which I shall explain more in detail later, they are far more fit for the production of forests." Dr. Gifford takes up first the improvement of soils by forest growth, and then the fixation of sand dunes. The experience of European countries in dealing with tasks of which we in this country are only beginning to realize the importance, is largely cited.

Report of the Forester for 1900. By GIFFORD PINCHOT. From the Annual Reports, U. S. Department of Agriculture. Pp. 9.

The Report of the Forester for 1900 can be obtained by application to the Department of Agriculture. The last year's very remarkable advance in all things relating to forestry has been led by the Department of Agriculture and has registered itself in its work. The following extract from the summary of principal results will indicate how much is being done:

"During the year applications were received for working plans for 48,078,449 acres, personal examinations on the ground were made of 2,103,670 acres, working plans were begun upon 1,325,000 acres, plans were completed for 179,000 acres, and 54,000 acres were put under management. In accordance with the request of the Secretary of the Interior, the preparation of a working plan for the Black Hills Forest Reserve was begun as the first step toward conservative lumbering on the national forest reserves. The working plans already in operation under the supervision of this Division were all continued, and the character of the work was in nearly all cases much improved.

"Planting plans were prepared for 59 land owners in 11 States. A unique and most promising study of the effect of forest cover on the flow of streams was begun in southern California through the courtesy and coöperation of the Arrowhead Reservoir Company of San Bernardino. Studies of forest fires were made in 26 States, and the grazing investigation requested by the Interior Department for the national forest reserves was inaugurated. Working plans were also begun for the New York State Forest Preserve.

"The investigations of the growth and reproduction of commercial trees were continued and

extended, and the studies in the history of forestry produced important results, now ready for publication."

Of the applications for working plans Mr. Pinchot says: "Since the introduction of practical forestry on the national forest reserves and on private lands alike depends more than on any other factor upon the ability of the Division of Forestry to comply with these requests, the meagerness of its resources is the most effective of all hindrances to the progress of forest reform in the United States."

Report of the Chief Inspector of Timber and Forestry for Canada, 1900. By ELIHU STEWART, Chief Inspector of Timber and Forestry. Part V: Annual Report of the Department of the Interior for 1900. Pp. 15, Plates VII.

After pointing out that the management of forests is a legitimate function of the government, and urging the necessity of continuing the work in this line already begun in Canada, the author of this bulletin speaks of the Canadian spruce forests. "Fortunately this country," says Mr. Stewart, "so fruitful in natural resources, seems destined to supply the world with another product of the forest in the spruce timber, which will probably be as important and valuable in the future as the White Pine has been in the past." In support of this statement he quotes Mr. Geo. Johnson, who in a recent publication on the "Pulp Wood of Canada" says: "In Canada there is practically an unlimited supply of wood suitable for pulp of the highest character. The area of Canada upon which the Spruce grows is almost co terminous with the geographical boundaries. Far east the Spruce grows along the shores of Hamilton Inlet and the northern shores of the Gulf of St. Lawrence. Far north around the shores of Ungava Bay and far northwest in Coronation Gulf, and to the mouth of the Mackenzie River the Spruce matures and arrives at good size. Far west along the fiords of British Columbia, Spruce abounds, increasing in quantity as one goes north."

Much of the space in this bulletin is taken up with a description of the Canadian Forest Reserves. The fire question is discussed and the employment of fire rangers to assist the forest rangers is noted. Fire-guards have been completed in several of the reserves and every precaution is being taken to prevent future forest and prairie fires. The enlargement of the Rocky Mountain Park is again suggested, and tree planting on the plains is discussed.

The Forests of Allegheny County, Md. By George B. Sudworth. Maryland Geological Survey. Pp. 30. Illustrations 14. Map.

It is obviously important that the forest conditions in all parts of the country should be examined and reported on. Such reports, though not widely interesting, are invaluable for reference in every question concerning the forests, of any given region, and are to be welcomed whenever they appear, especially when as good

as this report for the Maryland Geological Survey. After reviewing briefly the geological conditions of Allegheny County, Mr. Sudworth describes the character and distribution of the forests and different forest trees. Then after explaining the relation of the lumbering and mining industries to reproduction, he takes up the fire question, and makes a number of suggestions about measures of protection against fire and the management of the woodlands. There is little in this report which will be new to those who are familiar with the forests of other parts of Maryland and the neighboring States, but there are a number of such passages as the following which, for the present, cannot be repeated too often:

"While in general the damage by fires in this region appears not to be great, especially since there is little or no apparent decrease in the forest cover, nevertheless, the combined effects upon all ages of growth are very appreciable. The greatest damage is done in the periodic destruction of from one to ten or more years' growth of seedlings and coppice sprouts. A few very young seedlings are also killed. Clearly, therefore, the productiveness of these forests is much reduced; in fact, where fires run through this young growth at short intervals it is practically held at a standstill for many years. Actual growth is confined only to such saplings and older trees as are, from their size, capable of withstanding light fires. The direct effect of retarded production would be much more apparent to consumers of timber in the region than it is now, if these forests were systematically cut over for the fullest utilization of timber. The present timber-producing stock would eventually be exhausted. Wooded areas which now give the impression to many of being constantly stocked and improving would soon be reduced to an unproductive state. Many acres of woodland are thus to be found which yield practically nothing, from the fact that all small stock is periodically destroyed."

PUBLICATIONS RECEIVED.

Forty-Third Annual Report of the State Horticultural Society of Missouri. Tribune Printing Co., Jefferson City. Pp. 431.

Transactions of the Massachusetts Horticultural Society, 1900. Part I. Boston. Pp. 126.

A Yearbook of Kentucky Woods and Fields. By Ingram Crockett. C. W. Moulton, Buffalo. Illustrated. Pp. 112.

The Uses of Water in Irrigation Part I. By Elwood Mead and C. L. Johnston. Reprinted from U. S. Department of Agriculture, Office of Experimental Stations, Bulletin 86. Pp. 82. Plates XXVI. Figs. 13.

Notes on Crataegus in the Champlain Valley. C. S. Sargent. Reprinted from *Rhodora*, Vol. 3, No. 26, February, 1901.

New or Little Known North American Trees. II. C. S. Sargent. Reprinted from the *Botanical Gazette*, January, 1901.



Bird=Lore for 1901

BIRD-LORE'S special aim during the coming year will be to assist teachers and students of birds by telling them just what to study and just what to teach at the proper season. It will, therefore, publish a series of articles on the birds of a number of localities, including the vicinity of Boston, New York, Philadelphia, Chicago and San Francisco. To these will be added 'Suggestions for the Months' Study' and 'Suggestions for the Months' Reading.' The whole thus forms a definite plan of study which, it is believed, will be of the utmost value to the instructor, to the independent observer, and to bird-clubs and natural history societies. In this connection much assistance will be rendered by BIRD-LORE'S *Advisory Council*, composed of over fifty prominent ornithologists, residing throughout the United States and Canada, who have consented to respond to requests for information and advice.

While a number of the more general articles for the year will bear on the months' subject for study, there will also be contributions of wide popular interest, among the more important of which may be mentioned an address on Audubon, by Dr. Elliott Coues; letters written by Audubon in 1827; John Burroughs' list of his rarer bird visitors; Frank M. Chapman's fully illustrated account of a bird-nesting expedition with this genial naturalist; Ernest Seton-Thompson's 'How to Know the Hawks and Owls' (illustrated); Tudor Jenks' 'From an Amateur's Point of View'; T. S. Palmer's 'Ostrich Farming in America' (illustrated); F. A. Lucas' 'Birds of Walrus Island,' with remarkable illustrations; H. W. Henshaw's 'Impressions of Hawaiian Birds'; C. Will Beebe's illustrated account of some of the birds under his charge at the New York Zoological Garden, and an important paper on 'Bird Protection in Great Britain,' by Montagu Sharpe, chairman of the English Society for the Protection of Birds.

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